

ABSTRACT OF THE DISCLOSURE

5 A low-cost haptic feedback trackball device for providing haptic feedback to a user for enhancing interactions in a graphical environment provided by a computer. The trackball device includes a sensor device that detects the movement of a sphere in two rotary degrees of freedom. An actuator applies a force preferably along a z-axis perpendicular to the plane of the surface supporting the device, where the force is transmitted through the housing to the user. The output force is correlated with interaction of a controlled graphical object, such as a cursor, with other
10 graphical objects in the displayed graphical environment. Preferably, at least one compliant element is provided between a portion of the housing contacted by the user and the support surface, where the compliant element amplifies the force output from the actuator by allowing the contacted portion of the housing to move with respect to the support surface. The force can be an inertial force, contact force, or a combination of forces that provide tactile sensations to the
15 user.